Solutions for Demanding Applications

VarTech Systems Inc.

Industrial Flat Panel Displays

VT121 DiamondVue/CrystalVue Series

12.1” Flat Panel Series LCD Monitors VT121P-2 · VT121PSS-2 · VT121PHB-2 · VT121PHBSS-2 · VT121C-2 · VT121CHB-2

User's Guide

Read these instructions completely before attempting to operate your new Color Display.

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INTRODUCTION

SECTION 1

1.1 About LCD Monitors

A liquid crystal display (LCD) is a thin, flat panel used for electronically displaying information such as text, images, and moving pictures. Among its major features are its lightweight construction, its portability, and its ability to be produced in much larger screen sizes than are practical for the construction of cathode ray tube (CRT) display technology. Its low electrical power consumption enables it to be used in battery-powered electronic equipment. It is an electronically-modulated optical device made up of any number of pixels filled with liquid crystals and arrayed in front of a light source (backlight) or reflector to produce images in color or monochrome.

The LCD determines the function of the video board which converts the analog RGB (Red, Green, Blue) signals from a standard video card to a high quality, digital RGB that the LCD can display.

The Video Card is the responsible for allowing the device to “scale” a particular video resolution to the “native” resolution of the LCD. Simply, consider that a computer is putting out a VGA [640x480] resolution signal, yet the LCD that is connected is an XGA [1024x768] display. The displayed picture would be in the center 1/3 of the LCD. With the introduction of the scaling engine the converter will mathematically recalculate the 640x480 to 1024x768. This may sound simple but it is in fact a complex algorithm that adjusts for different aspect ratios and pixel alignment, essentially smoothing text and graphics to produce a picture that is pleasant to the eye. All Vartech displays from 12.1” (800x600) to 23.1 (1600x1200) incorporate scaling engines in the converter card.

1.2 Product Safety Precautions

Ensure that sufficient space is available around the display to provide the circulation necessary for cooling.

Ensure that the ambient air temperature will not exceed the specified maximum temperature.

Do not attempt to service this display yourself. The rear chassis has a seal so that non qualified personnel will not expose themselves to dangerous voltages or other risks.

To protect from electrical shock, unplug the display power supply from the wall before moving.

Do not expose the display to direct sunlight or heat.

Do not use this display near water.

Do not place any heavy objects on the power cords. Damage may cause electrical shock.

⇒ Unplug the power supply from the wall or unit if one of the following conditions exists:

Power cord or plug is damaged or frayed.

Liquid is spilled onto the display or the display is exposed to rain or water.

The display does not operate normally when the operating instructions are followed.

The display has been dropped or the enclosure has been damaged.

The display exhibits a distinct change in performance, indicating a need for service.

SECTION 2

DISPLAY SETUP

2.1 VT121 Series Display Features

The VT121 is capable of displaying 16.8M colors in a continuous spectrum. The high contrast LCD enhances the image with no geometric distortion.

The VT121 Series directly accepts an analog 5 wire RGB with separate H/V.

The VT121 Series is auto synchronous adjusting the display to the appropriate VGA input.

The VT121 Series is available in Panel Mount industrial packages.

The VT121 Series is supplied with an Anti-Reflective Screen unless equipped with an optional Touch System.

The VT121 Series has 120 VAC supply as standard.

2.2 Unpacking and setting up your display

Your LCD monitor package will consist of the components listed below. Open shipping container and lay all components on a flat clean surface.

2.3 What is included with your display

VT121P-2 LCD Monitor
5 ft Video Cable.
A 120VAC power connection.
10-32 Mounting Hardware. (For use with Panel Mount only)
6 ft RS232 Touch Interface Cable (Optional when touch is installed)
CD ROM with Touch Screen Drivers (Optional when touch is installed)
Users Manual

2.4 Connecting the Display

1 Connect all cables to the computer first. This would include the VGA cable and the optional RS 232 serial or usb touch screen connection.
2 After connecting the cables between the LCD monitor and the computer, plug the customer supplied 120VAC source to the 120VAC connection on the rear.
3 Once the 120VAC connection is made and switched on, the display is active.
4 If your computer was off, turn on your computer.
5 Your display should now operate as a normal computer display showing your OS or the video that is being sent to the flat panel.

Note: If for any reason the display goes blank and gives an “Out of Range” or “No Input Signal”, your computer or video source is putting out a signal that is out of range of the LCD’s video board. If this happens, reboot the computer or video source and make sure you are inputting the correct signal. If the display doesn’t work properly, it may be because:

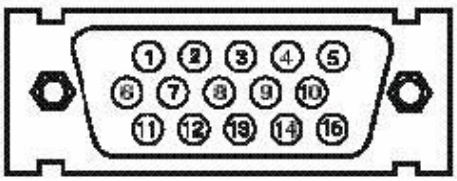
(a) The resolution is too high or low for the LCD.
(b) The refresh rate is set too high. Refresh on an LCD is different than a CRT. Set the refresh to 60Hz. CRT’s need a high refresh rate to avoid flicker. The refresh rate has no impact on LCD’s.
(c) The power source is incorrect.
(d) The unit is malfunctioning. If you believe this to be true, disconnect the video cable from the rear of the LCD and connect to a known good computer CRT display. If the computer display is working satisfactory and the video is within the appropriate range, then contact Vartech Customer service for a RMA number at 800-223-8050.

2.5 Signal Connections

To avoid irregular operation and /or damage to the display, please insure correct video is being supplied as shown on the following page.

You can use an HD-15 connector cable or a BNC adapter cable to connect the flat panel monitor to the host computer. The HD-15 video cable (supplied in the kit) used with this monitor is equipped with a conventional HD-15 connector at each end.

Note:
The following figure is the view looking into the pin end of the male connector or solder terminal end of the female connector.



Standard Resolution Supported
⇒ 800 x 600 (VGA)

Composite Video Input Connector: CVBS 1.0V p-p
S-Video: S-VHS LUMA Signal Input 0.7V p-p CHROMA Signal Input 0.7V p-p

Pin assignments for the HD15 video connector.	
Pin	
1	Red Video
2	Green Video
3	Blue Video
4	Not Used
5	Return
6	Red Video Ground
7	Green Video Ground
8	Blue Video Ground
9	No Connection
10	Sync Ground
11	Not Used
12	Bi-Directional Data
13	Horizontal Sync
14	Vertical Sync
15	Data Clock (SCL)

2.5 Signal Connections Cont.

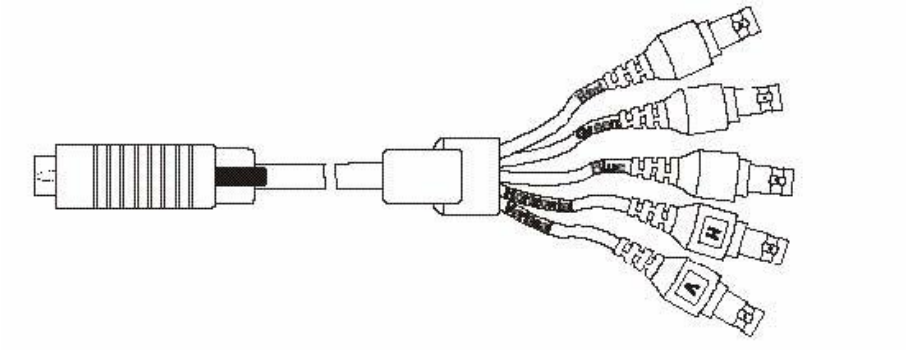
Optional BNC Adaptor Cable

A 5BNC-to-HD15 adapter cable is available. The functions of the cables are described below.

R, B, and G: Red, Green, and Blue input connectors to establish color. These are used for RS-343 analog signals.

HS/CS: Separate horizontal/composite sync signal from the video source.

VS: Separate vertical sync signal from the video source.



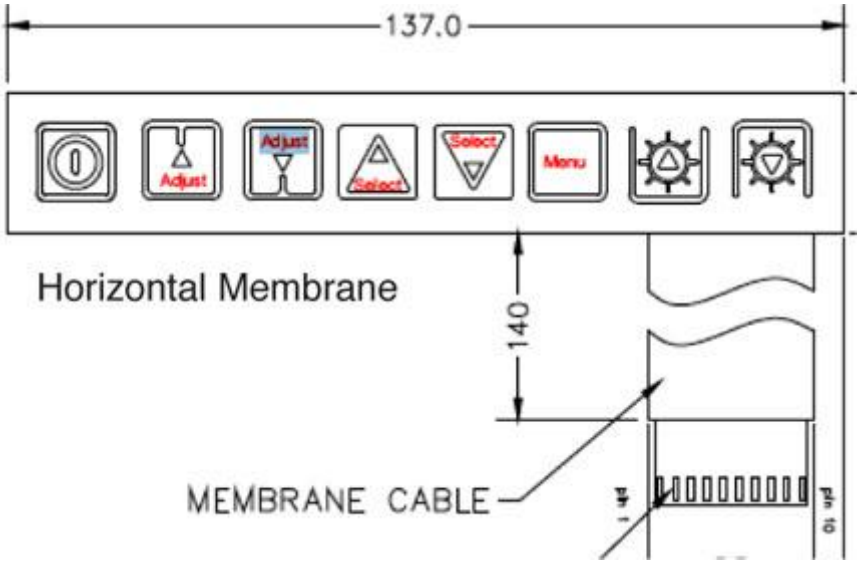
BNC Adapter Cable

This table describes the signal types you can use with the connectors:

BNC Signal Types						
BNC Signal Type	Description	R	G	B	HS/ CS	VS
Sync-on-Green	Use the three video connectors. Horizontal and vertical syncs are supplied on the green video line.	X	X	X		
Composite Sync	Use the three video connectors plus the horizontal sync/ composite sync input	X	X	X	X	
Separate Horizontal and Vertical Sync.	Use the three video connectors plus the horizontal sync/ composite sync and vertical sync input.	X	X	X	X	X

SECTION 3

3.1 Adjusting the display



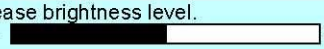
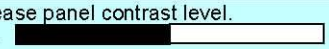
NOTE: By way of explanation the following refers to a set of sample buttons that may be obtained as an option. In addition to power on/off and connection for backlight brightness the controller provides an On Screen Display of certain functions which are controlled by 5 momentary type buttons (analog VR type) or 8 momentary type buttons (digital type):

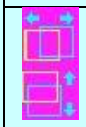
Controls	Analog VR type	Digital type
On/Off – turns controller board power on	VR toggle switch	On/Off button
Brightness – controls backlight brightness	Rotary VR	Brightness +/- buttons
Menu – turns OSD menu On or Off (it will auto time off) (Function with signal input only)	Menu button	Menu button
Select – Select function / Confirm (under OSD menu on state)	SEL DN	SEL DN
Move up to select individual RGB color level OSD page (under OSD menu on state)	SEL UP	SEL UP
+ – increase the setting / moves the selector to the next function (under OSD menu on state)	+	+

- - decrease the setting / moves the selector to the previous function (under OSD menu on state)	-	-
Load factory default	Press and hold SEL DN button to power on the controller	Press and hold SEL DN button to power on the controller
Lock OSD menu (Function with signal input only)	Press and hold MENU button for 15 seconds to enable / disable lock of the OSD menu	Press and hold MENU button for 15 seconds to enable / disable lock of the OSD menu
Switch to next input source (under OSD menu off state)	+	+

OSD Functions

	Selection page		
		Select input source4	
			Select input source to Analog RGB
			Select input source to DVI
			Select input source to S-Video 1
			Select input source to Composite 1
			Select input source to S-Video 2 (No function now)
			Select input source to Composite 2 (No function now)
		Auto Source Seek	ON – Auto source select always enable OFF – Disable auto source select function
		Video system selection* 4	

		Auto	Select Auto video system detection
		PAL	Select PAL video system
		PAL M	Select PAL M video system
		NTSC	Select NTSC video system
		NTSC 4.43	Select NTSC 4.43 video system
		SECAM	Select SECAM video system
	1280 1366	**Wide screen mode information display#**	Select the input mode (1280 / 1360 / 1366 / 1368) to recognize and display the correct input signal information display on the OSD menu. 1280 : 1280x768 1360 : 1360x768 1366 :1366x768 1368 : 1368x768
		Exit	Exit the OSD menu and save the settings
	Brightness and Contrast		
		Brightness	Increase/decrease brightness level. Press – or + (-  +) Total : 256 steps
		Contrast	Increase/decrease panel contrast level. Press – or + (-  +) Total : 192 steps
		Saturation*	Increase/decrease hue level. Press – or + (- +) Total : 256 steps
		Hue*	Increase/decrease saturation level Press – or + (- +) Total : 128 steps
		Exit	Exit the OSD menu and save the settings
	Color		
	Auto	**Auto RGB Calibration#**	✓ Yes ✗ No (See appendix IV)
		Color Temperature ▸	(Adjust the warmness of the image displayed. The higher temperature the coolest image looks like. The lower temperature the warmest image looks like.)
			Adjust red color level Press – or + (- +) Total :128 steps Adjust green color level Press – or + (- +) Total : 128 steps Adjust blue color level Press – or + (- +) Total : 128 steps Press SEL UP/DN button to select item
		4200k	Set the color temperature to 4200K
		5000k	Set the color temperature to 5000K
		6500k	Set the color temperature to 6500K
		7500k	Set the color temperature to 7500K
		9300k	Set the color temperature to 9300K
		Gamma adjustment ▸	Adjust Gamma settings (0.4 / 0.6 / 1.0 / 1.6 / 2.2)
		0.4	Select Gamma to 0.4
		0.6	Select Gamma to 0.6
		1.0	Select Gamma to 1.0
		1.6	Select Gamma to 1.6
		2.2	Select Gamma to 2.2

		Exit	Exit the OSD menu and save the settings
	Position#		
		Autosetup	Auto adjust the positions, phase, frequency Yes No
		Frequency	Adjust the image horizontal size
		**Phase Image Horizontal Position Image Vertical Position**	Fine tune the data sampling position (adjust image quality) Use +/- to move the image horizontally Press – or + (-+) Use +/- to move the image vertically Press – or + (-+)
		Exit	Exit the OSD menu
	Utilities		
		OSD setting 4	
			OSD Timeout : 0 / 10 / 20 / 30 / 40 / 50 / 60 seconds (Always on when set to 0) Press – or + (-+) OSD menu horizontal position Press – or + (-+) OSD menu vertical position Press – or + (-+)
		Load Factory Default Sharpness	Initialize the setting stored in non-volatile memory Adjust sharpness level Press – or + (-+) Total : 49 steps
		Exit	Exit the OSD menu
	Exit the OSD menu		

SECTION 4

TOUCHSCREEN

4.1 Introduction

Touch screens are a common means to interface operator inputs to a system. The universal standard of Windows GUI (Graphical User Interface) has significantly increased the use of touch screens.

There are four main touch technologies. The technologies are resistive, surface acoustic wave (SAW), capacitive, and infrared (IR). Each touch technology has advantages and disadvantages based on different user applications.

4.2 Installation

All Vartech Systems displays configured with a touch screen are supplied with a CDROM which includes user manuals, application software, and drivers for various operating systems. Insert the supplied CDROM into a CDROM drive and follow the installation instructions that will appear on the screen.

Technical support is available by contacting Vartech Systems customer support at 800-223-8050.

SECTION 5

5.1 Troubleshooting

General
A general guide to troubleshooting a flat panel display system it is worth considering the system as separate elements, such as: Controller (jumpers, PC settings) Panel (controller, cabling, connection, panel, PC settings) Backlight (inverter, cabling, backlight tubes) Cabling Computer system (display settings, operating system) Through step by step cross checking with instruction manuals and a process of elimination to isolate the problem it is usually possible to clearly identify the problem area.

No image:
If the panel backlight is not working it may still be possible to just see some image on the display. A lack of image is most likely to be caused by incorrect connection, lack of power, failure to provide a signal or incorrect graphic card settings.

Image position:
If it is impossible to position the image correctly, ie the image adjustment controls will not move the image far enough, then test using another graphics card. This situation can occur with a custom graphics card that is not close to standard timings or if something is in the graphics line that may be affecting the signal such as a signal splitter (please note that normally a signal splitter will not have any adverse effect).

Image appearance:
A faulty panel can have blank lines, failed sections, flickering or flashing display, incorrect graphics card refresh rate, resolution or interlaced mode will probably cause the image to be the wrong size, to scroll, flicker badly or possibly even no image. Incorrect jumper settings on the controller may cause everything from total failure to incorrect image. CAUTION: Do not set the panel power input incorrectly. Sparkling on the display: faulty panel signal cable.

Backlight:
Items to check include: Power input, Controls, Inverter and Tubes generally in this order. If half the screen is dimmer than the other half: Check cabling for the inverter. For a specific backlight tube check the AC pins orientation (CAUTION: Never reverse any DC power pins). Also: If adjusting brightness control has no effect the chances are that the VR rating or method of adjusting brightness is not compatible or correctly connected to the inverter. If system does not power down when there is a loss of signal

Continued failure:
If unit after unit keeps failing consider and investigate whether you are short circuiting the equipment or doing something else seriously wrong.

Generally after common sense issues have been resolved we recommend step by step substitution of known working parts to isolate the problem.

CLEANING AND MAINTANENCE

SECTION 6

6.1 Cleaning

Occasionally clean the display panel and cabinet with a soft cloth dampened (not soaked) with a mild (non-abrasive) glass cleaner. Keep turning a fresh side of the cloth toward the screen surface to avoid scratching it with accumulated grit.

Note:
The solvent should be applied only to the cloth, and not directly on the monitor screen.

Do not use paper products as they may scratch the surface. To minimize the risk of abrasion, allow the screen to stand dry. Special care should be taken when cleaning a touch screen or polycarbonate shield that is installed over the screen. Abrasive and certain chemical cleaners can easily damage the surface. Never use alcoholic or ammoniac cleaners to clean the polycarbonate shield or a touch screen.

Note:
For best results cleaning a monitor with the optional antireflective tempered glass display shield, a solution of denatured alcohol is recommended to thoroughly clean the display.

Replacing a Line Cord
To avoid shock and fire hazards, the monitor's power cord should be replaced if the insulation becomes broken or if it develops a loose internal connection.

Other Maintenance
Qualified service personnel should perform all maintenance, except for the power cord replacement described above.

MOUNTING INSTRUCTIONS

SECTION 7

7.1 Panel Mount Procedure

Mechanical Drawings		
Model	**Description**	**Page(s)**
VT121P-2	12.1" DiamondVue/CrystalVue Panel Mount Drawing (Nema 4/4x)	21
VT121C-2	12.1" DiamondVue/CrystalVue Open Frame Drawing	22

1. Cut and drill the panel (refer to panel mount drawing). Measurements are in inches.

Panel Mounting Cutout

2. If access to the side of the monitor is not available following installation, attach the power and video cables to the side of the monitor at this time.
3. Install the monitor in the prepared cutout.
4. Install the lock nuts and washers, supplied with the monitor, behind the holes running along the sides and

top/bottom of the cutout in the panel. Extra lock nuts and washers are provided.

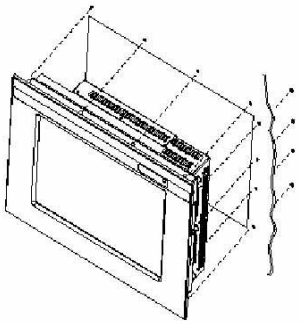
Note:
Use #10-32 nuts for mounting.

5. Tighten all mounting nuts evenly to a torque of 24 inch-pounds.

ATTENTION: Mounting nuts must be tightened to a torque of 24 inch-pounds to provide panel seal and avoid potential damage. Vartech Systems assumes no responsibility for water or chemical damage to the monitor or other equipment within the enclosure due to improper installation.

6. Attach the power and video cables to the side of the monitor if you have not already done so.

Generic Panel Mount Diagram



SPECIFICATIONS

DIAMONDVUE ENGINEERING SPECIFICATIONS	
Panel Size	12.1”
Type	Active Matrix Color Thin Film Transistor (TFT) VT121P2, VT121PSS2
Resolution Capabilities	SVGA, XGA
Pixel Pitch	SVGA 0.3075 (H) x 0.3075 (W) mm XGA 0.24 (H) x 0.24 (W) mm
Active Display Area	9.69” x 7.28” 246mm x 185mm
Pixel Format	SVGA 800 (H) x 600 (W) XGA 1024 (H) x 768 (W)
Viewing Angle (Left/Right)	SVGA 80/80 deg. XGA 70/70 deg.
Viewing Angle (Up/Down)	SVGA 80/60 deg. XGA 45/55 deg.
Contrast Ratio	600:1
Brightness	400 Nits (Typ.)
Response Time	SVGA 25ms (Typ.) XGA 33ms (Typ.)
Back Light	Diamondvue Cold Cathode 50,000 Hrs. Half Life
Input Connector	DVI-D, Analog VGA (DB-15), Composite (BNC), Four-Pin Mini-Din (S-Video)
Video Connector	DVI-D, Analog VGA (DB-15), Composite (BNC), Four Pin Mini-Pin (S-VIDEO)
Colors Supported	16.7M (8-bit/Color)
Video Input	Analog 0.7v p-p/75 ohm, Digital, NTSC/PAL
Sync	TTL Separate H & V, Combined, SOG
Input Voltage	120VAC, +12VDC optional
Power Source	12VDC @ 1.55A Optional: 90-264VAC Universal 24VDC @ 0.50A
Power consumption	30 Watts
Operating Temperature	0 to 50ºC
Storage Temperature	-20 to 60ºC
Operating Humidity	10 to 95%NC

Storage Humidity	10 to 95%NC
Operating Altitude	Up to 10,000 ft
Storage Altitude	Up to 40,000 ft
Dimensions	15.0” (w) x 12.5” (h) 381mm x 317.5mm
Cut Out Dimensions	13.7” (w) x 11.25” (h) 347.98mm x 285.75mm
Weight	9.5 lbs (4.31) NEMA 4 12.0 lbs (5.44) NEMA 4X
Bezel Finish	Black Powder Coat Aluminum Optional: NEMA 4X Stainless Steel
Touchscreen (Optional)	Resistive, Capacitive
Touch Interface	Serial, USB

SPECIFICATIONS

CRYSTALVUE ENGINEERING SPECIFICATIONS	
Panel Size	12.1”
Type	Active Matrix Color Thin Film Transistor (TFT) VT121PHB2, VT121PSSHB
Resolution Capabilities	SVGA, XGA
Pixel Pitch	SVGA 0.3075 (H) x 0.3075 (W) mm XGA 0.24 (H) x 0.24 (W) mm
Active Display Area	9.69” x 7.28” 246mm x 185mm
Pixel Format	SVGA 800 (H) x 600 (W) XGA 1024 (H) x 768 (W)
Viewing Angle (Left/Right)	SVGA 80/80 deg. XGA 70/70 deg.
Viewing Angle (Up/Down)	SVGA 80/60 deg. XGA 45/55 deg.
Contrast Ratio	600:1
Brightness	XGA 1000 Nits, SVGA 1050 Nits
Response Time	SVGA 25ms (Typ.) XGA 33ms (Typ.)
Input Connector	DVI-D, Analog VGA (DB-15), Composite (BNC), Four-Pin Mini-Din (S-Video)
Video Connector	DVI-D, Analog VGA (DB-15), Composite (BNC), Four Pin Mini-Pin (S-VIDEO)
Colors Supported	16.7M (8-bit/Color)
Video Input	Analog 0.7v p-p/75 ohm, Digital, NTSC/PAL
Sync	TTL Separate H & V, Combined, SOG
Input Voltage	120VAC, +12VDC optional
Power Source	12VDC @ 1.55A Optional: 90-264VAC Universal 24VDC @ 0.50A
Power consumption	30 Watts
Operating Temperature	0 to 50ºC
Storage Temperature	-20 to 60ºC
Operating Humidity	10 to 95%NC
Storage Humidity	10 to 95%NC
Operating Altitude	Up to 10,000 ft

Storage Altitude	Up to 40,000 ft
Dimensions	15.0” (w) x 12.5” (h) 381mm x 317.5mm
Cut Out Dimensions	13.7” (w) x 11.25” (h) 347.98mm x 285.75mm
Weight	9.5 lbs (4.31) NEMA 4 12.0 lbs (5.44) NEMA 4X
Bezel Finish	Black Powder Coat Aluminum Optional: NEMA 4X Stainless Steel
Touchscreen (Optional)	Resistive, Capacitive
Touch Interface	Serial, USB

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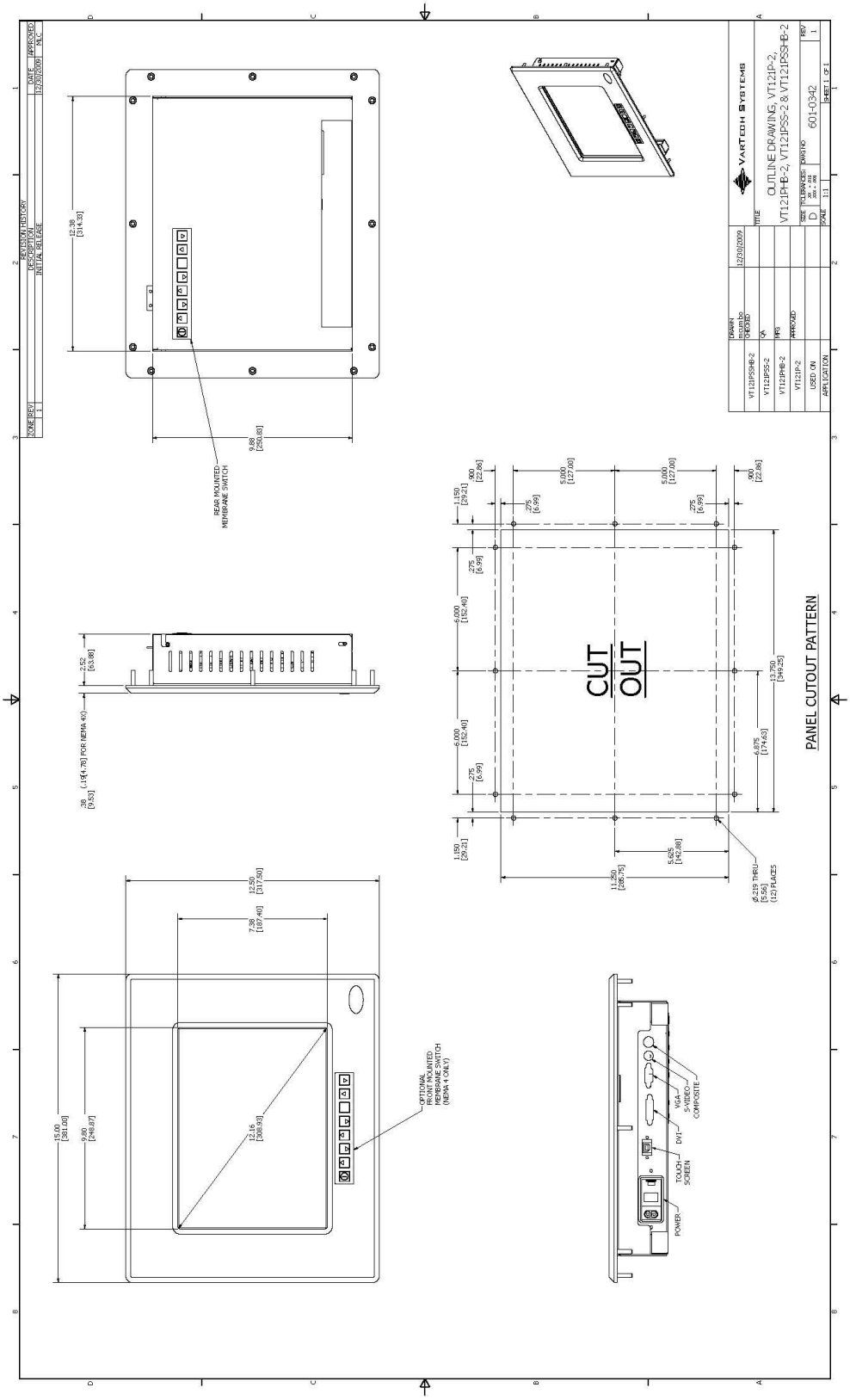
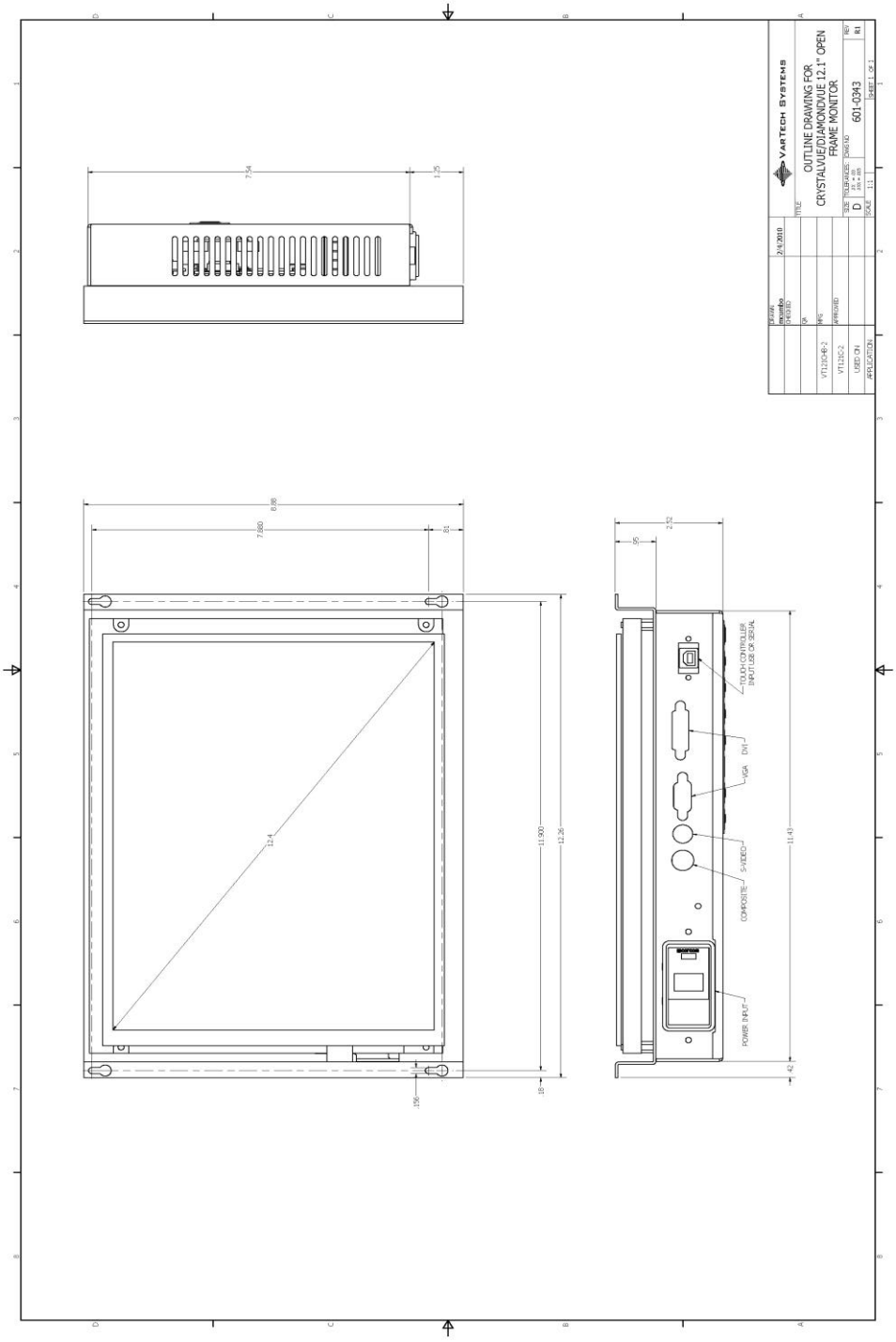
www.vartechsystems.com


REVISION HISTORY
ZONE REV DESCRIPTION DATE APPROVED
1 INITIAL RELEASE 12/30/2009 HLC
VARTECH SYSTEMS
OUTLINE DRAWING, VT121P-2,
VT121P-B-2, VT121PSS-2 & VT121PSH-B-2
DRAWING NO 601-0342
REV 1
SIZE D
SCALE 1:1
SHEET 1 OF 1
DRAWN 12/30/2009
VT121PSHB-2
VT121PSS-2
VT121PHB-2
VT121P-2
USED ON
APPLICATION
REAR MOUNTED MEMBRANE SWITCH
12.38 [314.30]
9.88 [250.80]
2.52 [63.98]
.38 (.184-.76) FOR NEMA 4X) [9.53]
CUT OUT
PANEL CUTOUT PATTERN
1.150 [29.21]
.900 [22.86]
5.000 [127.00]
.275 [6.99]
6.000 [152.40]
13.750 [349.25]
6.875 [174.63]
5.625 [147.88]
11.250 [285.75]
Ø.219 THRU [5.56] (12) PLACES
12.50 [317.50]
7.38 [187.40]
15.00 [381.00]
9.80 [248.87]
12.16 [308.93]
OPTIONAL FRONT MOUNTED MEMBRANE SWITCH (NEMA 4 ONLY)
POWER
TOUCH-SCREEN
DVI
VGA SVIDEO COMPOSITE


VarTech Systems
OUTLINE DRAWING FOR
CRYSTALVUE/DIAMONDVUE 12.1" OPEN FRAME MONITOR
601-0943
REV
A1
SIZE
D
SCALE
1:1
SHEET 1 OF 1
DRAWN
2/6/2010
APPROVED
VT12IC46-3
VT12IC2
USED ON
APPLICATION
7.54
1.25
8.00
7.880
81
12.4
11.900
12.26
.156
.10
95
2.52
TOUCH CONTROLLER
INPUT USB OR SERIAL
DVI
VGA
S-VIDEO
COMPOSITE
POWER INPUT
11.43
.42